

MANAGEMENT OF CHIKUNGUNYA THROUGH SIDDHA

A Technical Report



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1.INTRODUCTION

1.1 Introduction

Chikungunya is a viral disease transmitted to humans by the bite of infected mosquitoes. The disease was first observed during the outbreak in 1952 on the Markonde Plateau, along the border between Tanganyika and Mozambique. Marion Robinson and W.H.R. Lumsden first described in 1955, according to Lumsden, the term “Chikungunya” is derived from the Makonde root verb “Kungunyala” which means “to become contorted” or more specifically to say “which bends up” which reflects the posture of patient suffering from the arthritic symptoms. This disease is almost always self limited and rarely fatal.

Chikungunya usually starts with sudden onset of fever, chills, headache, nausea, vomiting, joint pain with or without joint swelling and rash which is very similar to that of Dengue fever. Unlike dengue there is no haemorrhagic or shock syndrome.

1.2 Etiology

Chikungunya virus (CHIKV) belongs to the family *Togaviridae*, is member of genus *Alphavirus*. The vector of this disease is *Aedes mosquito* (Sps. *aegypti.*), which was the same vector for Dengue and Yellow fever. Recently the Pasteur Institute in Paris claimed that the virus has suffered a mutation that enables it to be transmitted by *Aedes albopictus* (Tiger Mosquito) also.

1.3 Epidemiology

Chikungunya was first described in Tanzania, Africa in 1952. An out break of Chikungunya was seen in Malaysia 1999.

In India a major epidemic of Chikungunya fever was reported during the last millennium viz.; 1963 (Kolkata), 1965 (Pondicherry and Chennai in Tamil Nadu, Rajahmundry, Vishakapatnam and Kakinada in Andhra Pradesh; Sagar in Madhya Pradesh; and Nagpur in Maharashtra) and 1973 (Barsi in Maharashtra). Thereafter, sporadic cases also continued to be recorded especially in Maharashtra state during 1983 and 2000.

In the year 2005 and 2006, there has been a huge outbreak of Chikungunya in India. There is no case reported from the Northern states like Haryana, Punjab etc., The states affected by the Chikungunya are Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, Kerala, Goa, Pondicherry, Madhya Pradesh, Gujarat, Rajasthan, Andaman & Nicobar, GNCT of Delhi, etc. The number of suspected cases in these states as on 30/10/2006 is given in the Table no.1.

Analysis of the recent out breaks has suggested that the increased severity of the disease may be due to a change in genetic sequence, altering the virus coat protein which potentially allows multiplying more easily in mosquito cells.

Table- 1 showing the number of suspected cases in India as on date 30/10/2006.

S. No.	Name of the State	No. of districts affected	Total fever cases/ Chikungunya cases suspected	No. of Confirmed cases
1.	Andhra Pradesh	23	77533	248
2.	Karnataka	27	760513	294
3.	Maharashtra	31	263268	679
4.	Tamil Nadu	35	64155	116
5.	Madhya Pradesh	21	60098	70
6.	Gujarat	25	72589	170
7.	Kerala	8	65434	38
8.	Andaman & Nicobar	2	4469	0
9.	GNCT of New Delhi	12	356	32
10.	Rajasthan	1	102	24
11.	Pondicherry	1	542	9
12.	Goa	2	260	2
TOTAL		188	1369319	1682

1.4 Clinical features

The incubation period of Chikungunya can be 2-12 days, but usually 3-7 days. After an incubation period there is a sudden onset of fever (>40° C or 104° F), chills, arthralgia or arthritis, rash, nausea, vomiting, headache, conjunctival suffusion, mild photophobia. The joints of the extremities are swollen and tender. Some patients may have incapacitating arthralgia or arthritis, which may last for weeks to months.

Acute Chikungunya fever lasts for few days to a couple of weeks but as Dengue fever, West Nile fever and other arboviral fevers, some patients may complain prolonged fatigue which lasts for several weeks. In the recent outbreak in Andhra Pradesh, the fever and crippling joint pain is the prevalent complaint. Fever lasted for 2 days but joint pains, intense headache, insomnia and an extreme degree of prostrations lasts for variable period, usually for 5-7 days.

1.5 Diagnosis

Diagnosis of Chikungunya is mainly made when the epidemic disease occurs with the triad of fever, rash and rheumatic manifestations. Viraemia present in most of the patients during the first 48 hours and in some cases it may be detected after 4 days also. Virus specific IgM antigens are readily detected by capture ELISA in patients recovering from Chikungunya fever and they persist in excess for 6 months.

Haemagglutination inhibition (HI) antibodies appear with cessation of viremia. All the patients will be positive by day 5-7 of illness. IgM capture ELISA is the main diagnostic tool to distinguish from Chikungunya.

Table No 2 - State-wise Status of Chikungunya Fever in India, 2006

State	No. of Districts affected	Total fever cases /suspected Chikungunya cases	2006			2007				2008			
			No. of samples sent to NIV/NICD	No. of Confirmed cases	No. of Deaths	Total fever cases /suspected cases	No. of samples sent to NIV/NICD	No. of Confirmed cases	No. of Deaths	Total fever cases /suspected cases	No. of samples sent to NIV/NICD	No. of Confirmed cases	No. of Deaths
1	II	2	3	4	5	6	7	8	9	10	11	12	13
Andhra Pradesh	23	77535	1224	248	0	39	39	11	0	0	0	0	0
Karnataka	27	762026	5000	298	0	1705	641	133	0	1104	203	17	0
Maharashtra	34	270116	5901	804	0	1762	297	135	0	1	1	1	0
Tamil Nadu	35	64802	648	116	0	45	13	10	0	0	0	0	0
Madhya Pradesh	21	60132	892	106	0	0	0	0	0	0	0	0	0
Gujarat	25	75419	1155	225	0	3223	238	122	0	49	23	12	0
Kerala	14	70731	235	43	0	24052	4732	909	0	68	35	14	0
Andaman & Nicobar	2	1549	0	0	0	0	0	0	0	0	0	0	0
GNCT of Delhi	12	560	560	67	0	203	203	22	0	0	0	0	0
Rajasthan	1	102	44	24	0	2	2	2	0	0	0	0	0
Pondicherry	1	542	52	9	0	0	0	0	0	0	0	0	0
Goa	2	287	75	2	0	93	93	18	0	0	0	0	0
Orissa	13	6461	171	34	0	4065	423	90	0	0	0	0	0
West Bengal	1	21	0	21	0	19138	1135	347	0	0	0	0	0
Lakshadweep	1	35	0	0	0	5184	10	10	0	0	0	0	0
Uttara Pradesh	4	4	4	4	0	4	4	4	0	0	0	0	0
Haryana		0	0	0	0	20	7	13	0	0	0	0	0
Total	216	1390322	15961	2001	0	59535	7837	1826	0	1222	262	44	0

1.6 Treatment

There is no specific management for Chikungunya. Vaccine is under investigation and not available. Symptomatic treatment is recommended. The line of management usually the rest, Intravenous fluids, anti pyretic, anti inflammatory, analgesic agents.

Chloroquine Phosphate (250 mg) once daily has been tried in the patients with fever and arthritis which has demonstrated promising results. Aspirin to be avoided.

1.7 Prevention and Control

The prevention of Chikungunya can be done through preventing the mosquito bites and preventing the mosquito breeding.

(a).To prevent mosquito bites:

Use mosquito repellents containing DEET on exposed skin

When indoors, stay in well-screened areas. Use bed nets if sleeping in areas that are not screened or air-conditioned.

When working outdoors during day times, wear long-sleeved shirts and long pants to avoid mosquito bite.

(b). To Prevent Mosquito breeding

The prevention of mosquito breeding can be done by three methods such as Source reduction, use of larvicide and biological controls.

- 1) Source reduction can be done by elimination of all potential vector breeding places near the domestic or peri-domestic areas. Not allowing the storage of water for more than a week. Straining of the stored water by using a clean cloth once a week to remove the mosquito larvae from the water and the water can be reused. The sieved cloth should be dried in the sun to kill immature stages of mosquitoes.
- 2) Pyrethrum extract (0.1% ready-to-use emulsion) can be sprayed in rooms (not outside) to kill the adult mosquitoes hiding in the house. Temephos can be used at the dose of 1ppm/ once a week in place where water cannot be removed such as water for cattles and other purposes.
- 3) Biological controls such as introduction of larvivorous fish, namely *Gambusia* and Guppy in water tanks and other water sources.

2.CONCEPT OF CHIKUNGUNYA IN SIDDHA

2.1. Historical Perspective

In Siddha system, the signs and symptoms of Vatha suram is similar to “Chikungunya”.

“குடற்தன்னில் சீதமலாது சுரமும் வராது
அசீரணமின்றி சுரம் வராது”.

(தேரையர்)

Anar pitham is the one of the types of Pitham. It is located in stomach and intestine, which separates the nutrition from the food. If, Kapham increased in stomach and intestine, which will decrease the function of anar Pitham, which will leads to indigestion and fever.

2.2. Symptoms in Siddha System of Medicine:

“வாத சுரத்தின் குணங்கேளாய்
மயிரிக் கூச்செறிவோடு டல் குளிரும்
போத நடுக்குங் கை கால்கள்
பொருத்து தோறு முளைவாகும்
பேத முக மினுமினுக்கும்
புறந் தானதைத்து வெளுத்திருக்கும்
ஊதை மிகுத்து மலம் வரளு
முடனே ந்ருஞ் சிறுத்துடுமே”.

“தோன்று முடலந் தனை நறுக்கித்
துவைத்தாற் போல நடுக்க முற்றிப்
சான்ற வுணவு வேண்டா நஞ்
சது போற் சக்தி யருவருப்புந்
நேற்ற விரவும் பகலுந்தா

னில்லை யறக்க முன்றோ வாய்
நான்ற கைகால் கடுத்துழற்றி
நலஞ்சேர் சந்து முளைந்திடுமே.
(ஆதாரம்: சித்த மருத்துவம்)
“செப்புகிறேன் வாதசுரத் தின்கு ணத்தைத்
திருமுகமு முதடுமே கறுத்துக் காணல்
தப்புகிறேன் சரீமெல்லாந் தடித்து நோதல்
தாகந்தான் மிகக்காணல் மெய்ந் டுக்கல்
திப்புகிறே னுடம்புதிமி ரெடுக்க முட்ணம்
தேகம்பா ரித்திருக்கல் மலபே தத்தால்
குப்புகிறே குளிர்ந்துமயிர்க்கூச் செறித லிந்தக்
குணமெல்லாம் வாதசுரக் கூறுமாமே”
-யுகி வைத்திய சிந்தாமணி 800
-பக்கம் 52 பாடல் 139

1. Rigor with fever
2. Pain in the major joints associated with swelling especially knee, elbow shoulder and ankle joints, small joints may also be affected
3. Stiffness of joints
4. Restricted movements
5. Flatulence
6. Vomiting
7. Anorexia
8. Lacrimation in the eyes, heaviness of head.
9. Sleeplessness
10. Restlessness
11. Blackness of the face and lips

2.3 Comparision of Vadha Suram and Chikungunya

In Siddha system of medicine disease classifications are based on the symptoms, vitiation of humours and line of treatment. In this clinical entity fever and arthritis are the most important and predominant symptoms and it has to taken up for the correlation with

Chikunguniya. Thus, in Siddha system of medicine the symptom fever has been classified in to several clinical entities.

It has been classified in to sixty four types and in to two categories is called as thanvali suram(fever due to the constitutional pathology) and piravali suram(diseases caused by the extrinsic factors) under first category 12 types and second category 52 types are found to be described. The signs and symptoms manifested in the disease can be correlated with Vatha suram. The symptoms were described in Vatha suram is resembles like Chikunguniya symptoms.

2.4. Management of Chikungunya in Siddha

Chikungunya is not a life threatening infection. The treatment modalities of Chikungunya can be categorised into symptom modifiers and general health promoters; more specifically to say the drugs which improve the Quality of Life (QOL) and Vector control measures/ agents are beneficial in the management of Chikungunya.

Commonly used Siddha formulations in the management of Chikungunya symptoms

(1). Fever:

1. Bramanandha Bairava Mathirai - Twice daily after meals
2. Linga Chenduram 100mg + Thrikadugu chooranam 1gm - Twice daily with honey after meals.

(2). Fever with Arthritis:

1. Vishnu Chakkara Mathirai - Twice daily after meals
2. Amukkara tablet - 1-3 times with hot water
3. Sivappu Kukkil Thylam - External Use
4. Karpoorathi thylam - External Use
5. Vatha sura Kudineer - 60 ml twice daily before Meals
(Equal quantity of 4 & 5, mix well and apply externally over the affected area)
6. Vatha Sura Kudineer

(3). Other Formulations

1. Nilavembu Kudineer - 60 ml twice daily before meals
2. Amukkara Chooranam - 1gm thrice daily with honey

3. Arumuga Chenduram - 100 mg thrice daily with honey

(4). Post Arthralgia condition

1. Arumuga Chenduram	100 mg	2 times with honey after food
Pavala Parpam	50 mg	
Naga Parpam	50 mg	
Amukkara Chooranam	1 gm	
2. Gowri Chintamani	100 mg	2 times with honey after food
Vasanth Kusumakara Maathirai	1 pill	
Thali sathi Chooranam	1 gm	
3. Chanda Maarutha Chenduram	50 mg	2 times with honey after food
Thrikaduku Coornam	1 gm	
4. Ayaveera Chenduram	50 gm	2 times with honey after food
Sangu Parpam	100 mg	
Amukkura Chooranam	1 gm	

External applications

1. Visha Musti Thailam
2. Vatha Kesari Thailam

2.6. Diet and Life style adoption

Ahara (Diet):

1. Always have home made fresh food, plenty of lukewarm liquids, light and warm diet, liberally use ginger and turmeric in foods
2. Always avoid food prepared under unhygienic conditions, contaminated and stale food, Cold drinks, beverage etc.,

Vihara (Life style):

1. Avoid visiting the disease prevalent areas
2. Proper sanitation measures to be followed.

3. Management of chikungunya in Siddha

3.1 Indain Medicine and Homoeopathy Department, Chennai

Indain Medicine and Homoeopathy Department, Chennai conducted special camps for the treatment of Chikungunya from 25/09/2006 to 09/10/2006 in participation and under overall supervision of Directorate of Public Health and Preventive Medicine, Chennai. Camps were conducted at all levels of Districts, Taluka and Primary Health Centers and patients were provided with Siddha and Ayurvedic combinations of medicine, prepared by Government Pharmacay and supplied through by TAMPCOL, Chennai. There are 2 types of drug regimens administered based on the course of the disease i.e., pyrexial state (3 to 5 days) and post pyrexial state.

The drug regimen administered to patients in pyrexial state

- | | |
|---|----------------------------------|
| 1.Thridosa Mathirai | 1-2 pills twice daily with honey |
| 2.Sudarshana Churna | 1 g twice daily with honey |
| 3.Nilavembu Kundineer | 15-30 ml twice daily |
| 4.Pinda tailam and
Karpooradi tailam | For external use |

The drug regimen administered to patients in post-pyrexial state

- | | |
|--|----------------------------|
| 1. Ayaveera Chenduram | 100 mg |
| 2. Sudarshana Churna | 1 g twice daily with honey |
| 3. Nilavembu Kundineer | 15-30 ml twice daily |
| 4. Pinda tailam and
Karpooradi tailam | For external use |

Total number of probable cases of Chikungunya patients treated with above drug regimen were 95,968 as on 21st November 2006 and 24,397 on subsequent period.

3. 2 National Institute of Siddha, Chennai

Probable cases of Chikungunya patients visiting Out Patient Department of National Institute of Siddha, Chennai during 30/09/2006 to 26/12/2006 were administered with the following drug regimen mentioned below. Total 5538 patients received the treatment

1. Brammananda Bairavam Mathirai 100-200 mg tablet thrice daily with honey / hot water
2. Ammukkara Choornam 500mg-1 g tablet thrice daily with honey / hot water
3. Nilavembu kudineer 5 g twice daily
4. Pain Balm External use
5. Vatakesari thailam and Laghu Vishamushti thailam External use

Total cases received the treatment were 5538 of which new cases were 3584 (male - 1547, Female - 2027, Children - 10) and follow up cases were 1954 (male - 841, female - 1103 and Children - 10).

3. 3 Government Hospital (Siddha wing), Thiruchengodu

Common people visting Government Hospital Siddha wing, Thiruchengodu were provided with leaflets containing information on preventive aspect of the disease.

Probable cases of Chikungunya patients presented with fever were admistered **Bramanandha bairana Mathirai, Linga chenduram** 100 mg, Trikaduga Choornam 1g twice daily with honey after food. Patients presented with fever and arthritis were put on following drug regimen.

1. Vishnu Chakkara Mathirai- Twice daily after meals
2. Amukkara tablet - 1-3 timeswith hot water
3. Vatha sura Kudineer - 60 ml twice daily before meals
4. Sivappu Kukkil Thylam - External use
5. Karpoorathi thylam - External use

(Equal quantity of 4 and 5 are mixed and applied externally over the affected area)

Table: 1 Number of Chikungunya cases studied in Government Hospital Thiruchengodu

Date	New Patients			Old Patients			Total			Total
	Male	Female	Children	Male	Female	Children	Male	Female	Children	
25/7/06	164	117	27	239	189	21	403	306	48	767
26/07/06	198	101	18	175	189	5	373	290	23	686
27/07/06	172	126	33	165	131	-	337	259	33	627
28/07/06	196	152	17	228	220	6	424	372	23	819
29/07/06	163	134	39	211	197	11	374	331	50	755
30/07/06	-	-1	-	119	108	3	119	108	3	230
Total										3884

Seventy four patients were taken up for a clinical study in probable cases of Chikungunya patients. Results of the therapy was detailed in table

Table- 2 Details of the patients, duration of the therapy and improvement

S. No.	Sign and Symptom	Total number of Patients	No. of Days treated	No. of patients Showed complete relief	No. of patients Showed Moderate relief
1.	Fever with rigor	37	3	31	6
2.	Pain and swelling				
	Knee	55	6	38	17
	Ankle	40	6	29	11
	MTP joints	16	5	12	4
	Hip	6	5	5	1
	Shoulder	8	5	6	2
	Cervical	4	5	3	1
	Elbow	22	6	19	3
	Wrist	18	7	15	3
	IP and MCP joints	12	5	8	4
3.	Fatigue	12	5	7	5

4.	Nausea	4	2	4	0
5.	Headache	12	3	11	1
6.	Giddines	11	3	9	2
7.	Itching	2	6	1	1
8.	Anorexia	4	4	4	0
9.	Insomnia	32	5	28	4
10.	Constipation	50	4	42	8
11.	Irritation in the eye	70	3	69	1
12.	Lymphadenopathy	13	5	10	3

11. Government Siddha Medical College, Palayamkottai

About 1063 patients visiting Noi Naadal Department of Government Siddha Medical College, Palayamkottai during 22nd September 2006 to 2nd January 2007 were administered with following drug regimen during pyrexial state.

1. Nilavembu Kudineer, 60ml 2 times before meals with honey
2. Amukkara Chooranam, 1gm thrice daily with honey
3. Arumuga Chenduram, 100 mg, thrice daily with honey
4. Vedi Annabethi Chenduram, 100 mg, thrice daily with honey
5. Pavala parpam, 50mg, thrice daily with honey
6. Pindathailam for external use
7. Karpoorathy thailam for external use

During post Chikungunya arthralgia patients were administered with one of the following drug regimen.

1.	Arumuga Chenduram	100 mg	
	Pavala Parpam	50 mg	
	Naga Parpam		2 times with honey after food
	Amukkua Chooranam	50 mg	
		1 gm	

2.	Gowri Chintamani	100 mg		
	Vasantha Kusumakara		1	pill
	Maathirai		2	times with honey after food
	Thali sathi Chooranam	1 gm		
3.	Chanda Maarutha	50 mg		
	Chenduram Thrikaduku	1 gm	2	times with honey after food
	Coornam			
4.	Ayaveera Chenduram	50 gm		
	Sangu Parpam	100 mg	2	times with honey after food
	Amukkura Chooranam	gm		

NOTE: Visha mushti thailam and Vatha Keasari Thailam for external application

Table- 3 Details of the patients, duration of the therapy and improvement

S. No.	Sign and Symptoms	Total number of Patients	No. of Days	No. f patients Showed complete relief	No. f patients Showed Moderate relief
1.	Fever with rigor	334	3	295	39
2.	Pain and swelling				
	Knee	838	10	762	76
	Ankle	902	8	806	96
	MTP joints	603	10	522	81
	Hip	496	6	411	85
	Shoulder	378	8	302	76
	Cervical	207	10	191	16
	Elbow	764	8	683	81
	Wrist	932	10	814	118
	IP and MCP joints	701	10	623	78
3.	Fatigue	632	4	591	41
4.	Nausea	263	4	204	59

5.	Headache	198	3	173	25
6.	Giddiness	411	4	384	27
7.	Itching	34	10	29	5
8.	Anorexia	372	5	331	41
9.	Insomnia	631	6	572	59
10.	Constipation	802	4	771	31
11.	Irritation in the eye	192	3	169	23
12.	Lymphadenopathy	48	6	37	11

3. 4 Central Research Institute for Siddha, Chennai (Multi center clinical observation)

A multi center open clinical observation was conducted to evaluate the effect of Nilavembu Kudineer in combination with three drug regimens (1 to 3) in probable cases of Chikungunya patients. Nilavembu Kudineer at the dose of 15 to 60 ml twice daily in combination with above drug regimen are administered to the patients visiting Out Patient Departments (OPD) of the four reputed Siddha institutes in Tamil Nadu.

The study drug was administered to the patients in following Centers :

1. National Institute of Siddha, Chennai.
2. Central Research Institute for Siddha, Chennai
3. Government Siddha College, Palayamkottai, District Trinelveli
4. Primary Health Center, Trichencode, District Namakkal.

Materials and Methods

The diagnosis of Chikungunya was made on the basis of clinical presentation. The patients presenting with following symptoms were considered as major symptoms for the diagnosis of Chikungunya, they are-

1. Fever with rigor
2. Pain and swelling in
 - i. Shoulder joint
 - ii. Elbow Joint

- iii. Wrist joint
- iv. Interphalangeal and Metacarpal Joints
- v. Hip joint
- vi. Knee joint
- vii. Ankle Joint
- viii. Metatarsal Joints
- ix. Cervical

3. Irritation in the eye

4. Constitutional Symptoms :

- i. Fatigue
- ii. Nausea
- iii. Headache
- iv. Giddiness
- v. Itching
- vi. Anorexia
- vii. Insomnia
- viii. Constipation

The Patients attending the Out Patient Department and all age groups of either sex presented with above symptoms were administered with the study drug. All the baseline symptoms were recoded at first visit.

Treatment arms

The study drug was categorized into 4 drug regimens

1. Drug Regimen-1 (during Pyrexial state)

2. Drug regimen -2 (during post pyrexial state)
3. Drug regimen -3
4. Drug Regimen-4

The Drug regimens 1 to 3 were administered with Nilavembu kudineer and the Drug regimen 4 was administered with Vatasura kudineer. Patients were asked to come for review everyday and they were administered with fresh decoction of Nilavembu kudineer.

Nilavembu Kudineer and Linga chenduram were subjected to preclinical evaluation (Annexure - 5) which includes acute and sub acute toxicity for Linga chenduram and anti pyretic activity. The dose, frequency, anupana and mode of administration of above drug regimens were illustrated in Table 19.1 - 19.4.

Duration of the therapy

The treatment for pyrexial state was for 3 days and post pyrexial state was 2 weeks.

Follow up

The patients were followed up once in every week. The symptoms were recorded at each visit and results were analyzed after 3 weeks.

Assessment of results:

The results were assessed based on the improvement in symptoms. The following criteria was used to assess the improvement-

- | | | |
|-----------------|---|---|
| Complete relief | - | Total relief in all symptoms |
| Marked relief | - | Patients are comfortable and relieved from all the symptoms |
| Moderate relief | - | Patient still suffering with mild symptoms |
| Mild relief | - | 25-50% relief in symptoms |
| No relief | - | Absolutely no relief in symptoms |
| LAMA | - | Patients discontinued or information not available. |

Observations:

The total number of patients received treatment for probable Chikungunya patients were 13773, of which the 4225 cases treated at National Institute for Siddha, Chennai, 1364 cases at Central Research Institute for Siddha, Chennai, 4300 cases at Government Siddha College, Palayamkottai and 3884 cases at Primary Health Center, Thiruchencode (Table 20.1).

The incidence of the disease observed more in females (56.8%) than males (43.2%). The majority of the age group affected were 30-40 years (31.2%) and rarely seen in children below 10 years (Table: 20.2 - 20.5).

Apart from fever, the most predominant symptoms were observed are pain and swelling in large joints (50.7%), fatigue (32.1%) and stiffness in the joints (23.8%) (Table -21.5).

The four drug regimens were administered to the probable cases of Chikungunya patients based on the clinical presentation. At the end of the therapy, 18.6% showed complete relief, 30.6% showed marked improvement, 32.1% moderate improvement, 10.1% showed mild improvement and 4.45% showed no relief. However 4.05% cases were probably discontinued therapy or withdrawn (Table-22).

Results showed that Nilavembu Kudineer and Bramanada Bairavam in pyrexia state and in post pyrexia state Amukkara chooranam, Linga chenduram and Gowri chinthamani chenduram have shown better therapeutic effect. The fever comes to normal within three days and in the case of post pyrexia states the symptoms like pain and swelling in joints, abdominal disturbances responded quickly within one week in majority of the cases. Within a few weeks these drugs have shown better effect in controlling the pain and swelling of the large joints.

As a preventive measure, use of Nilavembu kudineer daily has prevented the incidence of Chikungunya and effective in all age groups, which was observed by the physicians at Primary health centre, Trichencode.

Bramananda Bairavam was a proven drug in the management of fever even in delirium with fever, which showed better response in controlling the pyrexia. Nilavembu kudineer though it has been indicated in the treatment of fever, on pharmacological screening, which showed better anti inflammatory and analgesic effect than anti pyrexia effect (Ghosh *et. al*, 1981).

Linga chenduram, Amukkura chooranam and Gowri chindamani chenduram are the drugs of choice to produce the antipyretic, analgesic and anti-inflammatory effect, which was confirmed and evidenced in the pharmacological screenings (Ghosh *et. al*, 1977& 1981). **Among all the drug regimens, these drugs mentioned above only has produced the better therapeutic effect.**

Table – 4 Drug Regimen – I (Pyrexia state)

S. No	Name of the medicine	Dose	Vehicle	Remarks
1	Bramanadha bairavam	One to two pills twice a day	Honey	Internal use
2	Thirikadugu chooranam	One gm twice a day	Honey	Internal use
3	Nilavembu Kudineer	15 to 30 ml twice a day		Internal use
4.	Pinda thylam with Karpoorathy thailam	--	--	External use

Table – 5 Drug Regimen – II (Post Pyrexia state)

1	Linga Chenduram	100mg twice a day	Honey	Internal use
2.	Gowri chinthamani chenduram	100 mg twice a day	Honey	Internal use
2	Amukkara chooranam	One gm twice a day	Honey	Internal use
3	Nilavembu Kudineer	15 to 30 ml twice a day	-	Internal use
4.	Pinda thylam with Karpoorathy thailam	-	-	External use

Table- 6 Drug Regimen – III

1	Nilavembu Kudineer	60ml 2 times before meals	Honey	Internal use
2	Amukkara Choornam	1gm 3 times	Honey	Internal use
3	Arumuga Chenduram	100 mgm 3 times	Honey	Internal use

4.	Vedi Annabethi Chenduram	100 mgm 3 times	Honey	Internal use
8.	Pavala parpam	50mgm 3 times	Honey	External use
9.	Pindathailam	--	--	External use
10.	Karpoorathy thailam	--	--	External use

Table- 7- Drug Regimen – IV

1	Chandamarutha Chenduram	100mg twice a day	Honey	Internal use
2	Ayaveera Chenduram	100 mg twice a day	Honey	Internal use
3	Vathasura Kudineer	15 to 30 ml twice a day	-	Internal use

OBSERVATIONS

Table - 8 Total number of population covered in all 4 centers

S.No.	Name of the Institute	Total Patients received Study drugs
1.	National Institute for Siddha, Chennai	4225
2.	Central Research Institute for Siddha, Chennai	1378
3.	Government Siddha College, Palayamkottai	4300
4.	Primary Health Center, Trichencode	3884
TOTAL		13787

Age and Sex wise distribution of cases treated in Centers

Table -9 National Institute of Siddha, Chennai

S.No.	Age (in Years)	Male	Female	Male child	Female child	Total
1	0 – 10	-	-	6	9	15
2	10 – 20	128	182	-	-	310

3	20 – 30	251	335	-	-	586
4	30 – 40	586	679	-	-	1265
5	40 – 50	354	503	-	-	857
6	50 - 60	292	408	-	-	700
7	60 >	223	269	-	-	492
Total		1834	2376	6	9	4225

Table – 10 Central Research Institute for Siddha, Chennai.

Sl.no	Age (in Years)	Male	Female	Male child	Female child	Total
1	0 – 10	-	-	5	9	14
2	10 – 20	52	65	-	-	117
3	20 – 30	61	133	-	-	194
4	30 – 40	232	363	-	-	595
5	40 – 50	143	169	-	-	312
6	50 - 60	36	56	-	-	92
7	> 60	23	31	-	-	54
Total		547	817	5	9	1378

Table – 11 Government Siddha Medical College, Trinevelli

S.No.	Age (in Years)	Male	Female	Male child	Female child	Total
1	0 – 10	-	-	3	6	9
2	10 – 20	135	189	-	-	324
3	20 – 30	259	347	-	-	606
4	30 – 40	596	693	-	-	1289
5	40 – 50	357	508	-	-	865
6	50 - 60	294	411	-	-	705
7	>60	230	272	-	-	502
Total		1871	2420	3	6	4300

Table - 12 Primary Health Centre, Trichencode

Sl.no	Age (in Years)	Male	Female	Male child	Female child	Total
1	0 – 10	-	-	3	3	6
2	10 – 20	103	144	-	-	247
3	20 – 30	225	302	-	-	527
4	30 – 40	541	622	-	-	1163
5	40 – 50	338	485	-	-	823
6	50 - 60	268	378	-	-	646
7	>60	213	259	-	-	472
Total		1688	2190	3	3	3884

Distribution of symptoms among the the probable Chikungunya patients received trail drug in Out Patient Departments of 4 centers

Table - 13 National Institute of Siddha, Chennai

S.No.	Symptoms	Number of cases
1	Fever	2723
2	Pain and swelling (small joints)	318
3	Pain and swelling (large joints)	2453
4	Stiffness / Restricted movements	1052
5	Gastrointestinal symptoms (nausea / anorexia/ flatulence)	273
6	Abdominal pain	145
7	Headache	414
8	Skin rashes	172
9	Fatigue	1613

Table -14 National Institute of Siddha, Chennai

S.No	Symptoms	Number of cases
1	Fever	735
2	Pain and swelling (small joints)	118
3	Pain and swelling (large joints)	653
4	Stiffness / Restricted movements	451
5	Gastrointestinal symptoms (nausea / anorexia/ flatulence)	132
6	Abdominal pain	57
7	Headache	109
8	Skin rashes	33
9	Fatigue	112

Table - 15 Government Siddha Medical College, Trinevelli

S.No.	Symptoms	Number of cases
1	Fever	2581
2	Pain and swelling (small joints)	287
3	Pain and swelling (large joints)	2137
4	Stiffness / Restricted movements	916
5	Gastrointestinal symptoms (nausea / anorexia /flatulence)	263
6	Abdominal pain	154
7	Headache	317
8	Skin rashes	212
9	Fatigue	1345

Table - 16 Health Centre, Trichencode

S.No.	Symptoms	Number of cases
1	Fever	2101
2	Pain and swelling (small joints)	189
3	Pain and swelling (large joints)	1740
4	Stiffness / Restricted movements	871
5	Gastrointestinal symptoms (nausea / anorexia/ flatulence)	204
6	Abdominal pain	112
7	Headache	362
8	Skin rashes	89
9	Fatigue	1357

Table - 17 Distribution of symptoms among the patients received the study drug

S.No.	Symptoms	Name of the Center				Total no. of Cases presented with Symptom
		National institute of Siddha, Chennai	Central Research Institute for Siddha, Chennai	Government Siddha College, Tirunevelli	Primary Health Center, Trichencode	
1.	Fever	2723	735	2581	2101	8140
2.	Pain and swelling (Small joints)	318	118	287	189	912
3.	Pain and swelling (Major joints)	2453	653	2137	1740	6983
4.	Stiffness / Restricted movements	1052	451	916	871	3290

5.	Gastrointestinal symptoms – nausea, anorexia flatulence)	273	132	263	204	872
6.	Abdominal pain	145	57	154	112	468
7.	Headache	414	109	317	362	1202
8.	Skin rashes	172	33	212	89	506
9.	Fatigue	1613	112	1345	1357	4427

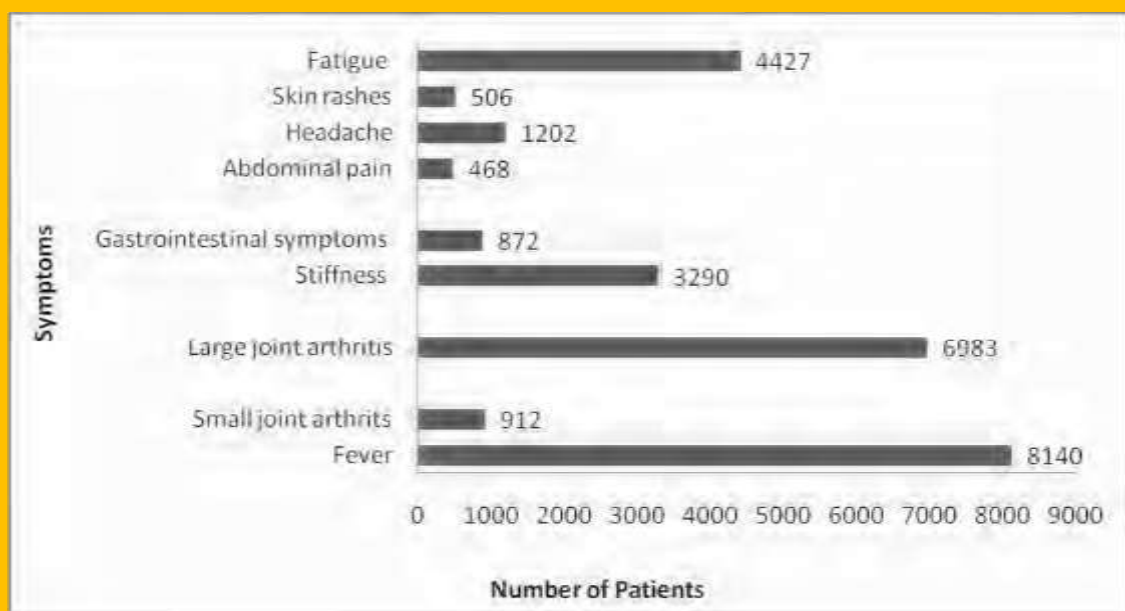
Table – 18- Overall improvement in probable Chikungunya cases after the therapy in 4 centers

S.No.	RESULTS*	Name of the Center				No. of cases improved
		National institute of Siddha, Chennai	Central Research Institute, Siddha, Chennai	Government Siddha College, Tirunelveli	Primary Health Center, Trichencode	
1.	Complete Relief	792	195	815	761	2563 (18.6%)
2.	Marked Relief	1279	281	1426	1235	4221 (30.6%)
3.	Moderate Relief	1404	397	1309	1312	4422 (32.0%)
4.	Mild Relief	402	295	386	309	1392 (10.1%)
5.	No Relief	187	108	176	142	613 (4.45%)
6.	LAMA	161	87	187	124	559 (4.05%)
Total number of cases treated		4225	1363	4299	3883	13770

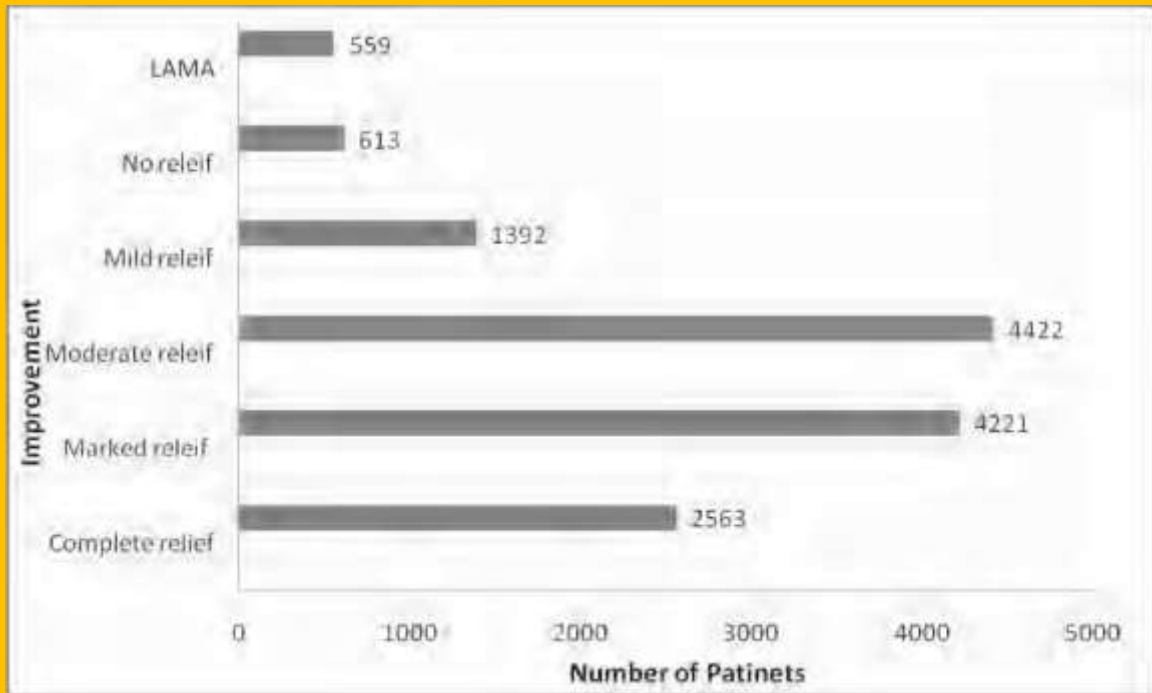
□ ASSESSMENT CRITERIA

Complete relief	-	Total relief in all symptoms
Marked relief	-	Patients are comfortable and relieved from all the symptoms
Moderate relief	-	Patient still suffering with mild symptoms
Mild relief	-	25-50% relief in symptoms
No relief	-	Absolutely no relief in symptoms
LAMA	-	Patients discontinued or information not available.

Graph-1 Distribution of symptoms among Chikungunya patients



Graph-2 Overall improvement in Chikungunya cases after the therapy.



**STRATEGY FOR RESEARCH IN
CHIKUNGUNYA**

**PRECLINICAL EVALUATION (PHARMACOLOGY) OF LINGA
CHENDURAM**

AND NILAVEMBU KUDINEER

1. Linga Chenduram was studied in acute and sub-acute toxicity models. The drug did not show any toxicity within 7 days after single exposure, but showed sub acute toxic affects in the doses of 200 and 500 mg/ kg body weight with presence of mercury in vital tissue and histopathological studies.
2. Linga chenduram was evaluated for its probable antipyretic, hypothermic, anti inflammatory and analgesic effect in various experimental models using albino rats and mice. The drug showed significant antipyretic activity comparable to that of Acetyl Salicylic Acid and Paracetamol. The drug also showed significant analgesic activity in mice by hot plate method.
3. Nilavembu kudineer, a mixture of nine herbal materials in equal parts have long since been used as febrifuge in Siddha medicine. The drug was screened for antipyretic, analgesic and anti-inflammatory activities in different experimental models. The drug showed significant anti-inflammatory effects in the doses of 20 and 30 ml /Kg, orally. The drug also showed the analgesic activity for 50 and 30 ml / kg, which showed 53.36% and 37.31% effect respectively.